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Semi-Analytic Estimates of Lyapunov Exponents in Lower-Dimensional Systems

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abstract Statistical arguments, seemingly well-justified in higher dimensions, can also be used to derive reasonable estimates of Lyapunov exponents χ in lower-dimensional Hamiltonian systems. This letter explores the assumptions incorporated into these arguments. The predicted χ's are insensitive to most details, but do depend sensitively on the nongeneric form of the auto-correlation function characterising the time-dependence of an orbit. This dependence on dynamics implies a fundamental limitation to the application of thermodynamic arguments to lower-dimensional systems.